TERRESTIAL AND FRESH WATER GASTROPODS OF THE ALLEGANY STATE PARK IN NEW YORK STATE[1]

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Since its gastropod fauna, particularly species of terrestrial habit, forms a relatively prominent part of the invertebrate fauna of the Allegany State Park in Cattaraugus County of western New York, and since the studies of the fauna and flora of the region of the Park made in connection with the Allegany School of Natural History are making the Park one of the better known natural history areas of the interior, it is desirable to record the species of gastropods that have been collected during a period of years. Our interest in the publication of the record is based also upon the need for furnishing additional basis for the studies of Natural History pursued in connection with the Allegany School of Natural History in the Park. The present list is not presumed to comprise the entire gastropod fauna of the region—perhaps no local list could justify such a presumption—but when our list is compared with those of other restricted localities and is checked against the general record of distribution, it may be supposed that the record is fairly inclusive.

The Park is a region of low mountains with relatively gentle wooded slopes to the beds of small brooks tributary to the loop of the Allegheny River that lies in New York State. The low mountains, up to 2300 feet, are of relatively uniform height, being merely the remains of the maturely dissected plain of the Allegheny Plateau. Glaciation extended almost to what are now the borders of the Park, but the Park itself is believed to be entirely without the glaciated territory. It may be remarked that all the terrestrial gastropods recorded here were taken from

[1] Contribution from the Zoological Laboratories of the Allegany School of Natural History, the University of North Carolina and Milwaukee-Downer College.

lands that never knew glaciation, although in some instances the places of collection were hardly a couple of miles from areas formerly occupied by glaciers.

The Park, about 100 square miles in extent, comprises comparatively little cultivated or open land. The forests are advanced second growth and are generally composed of maple, birch and beech with hemlock following in. In a few places there are well advanced hemlock forests or drier oak-hickory-chestnut associations. It is a region of relatively high precipitation for the state, with ground cover comparatively moist, supporting in quantity such low growing plants as ferns, club-mosses, Dalibarda, partridge berry and the like.

The waters of the Park are limited in variety, the gradients of the valleys being such as to prevent the formation of ponds or marshes. For unknown reasons the upland brooks are without the typical brook fauna of gastropods; *Goniobasis,* for example, is noticeably absent. In the first year of the School aquatic snails, other than ancylids, were found only in the lower part of Quaker Run. Since plants from other waters were introduced into the artificial lake constructed at the School on the upper part of Quaker Run, several species of pulmonate snails have appeared in great numbers in the lake, and a few in the run below. Operculate snails are still restricted, as far as we know, to the river and, perhaps, the lower reaches of its tributary waters. The only snail, other than the cap shells (ancylids) that we have reason to regard as native to the upper waters of Quaker Run, is the always rare *Menetus dilatus buchanensis* (Lea), of which only a single example has been found.

The territory covered here lies directly north of McKean County in Pennsylvania, for which, as well as for the other counties of the state, Dr. Brooks has recently published a list of terrestrial gastropods. Since it is to be expected that the two lists would be closely similar it seems worth while to indicate existing differences which might possibly be eliminated by further collecting.

Twenty-four of the thirty-seven land snails listed by us occur in McKean county; twenty-three of these are noted by Dr. Brooks; the twenty-fourth is represented by *Retinella indentata,*

taken just over the state line, in McKean County, in 1928 by Mr. Aretas Saunders. As all remaining twelve of our list[2] occur in more distant parts of Pennsylvania it is probable that they are present in the intervening region. Three species and one subspecies reported from McKean County, but wanting in our records,[3] may be expected to appear in the Park area, although they have so far escaped observation.

As the size of snails varies considerably in different parts of the country we have added data concerning size as far as they have been observed for each species.

For aid in confirmation or correction of identifications we are indebted to Dr. Frank C. Baker (Lymnaeidae), Dr. H. B. Baker, Dr. E. G. Berry, Dr. Stanley Brooks, Dr. William J. Clench (Physidae), Dr. W. B. Marshall of the United States National Museum, Dr. Henry A. Pilsbry, and Dr. Bryant Walker.

HELICIDAE. *Polygyra tridentata* (Say). Common under leaves and near old logs; generally buried; avoids the light. G.D. 13½ mm., H. 7 mm. (Blacksnake Mountain). G.D. 15 mm., H. 8 mm. (Lookout Trail). *P. inflecta* (Say). Only one immature specimen recorded. Measurements of mature local forms were not available. *P. sayana* Pilsbry. Rare. G.D. 19½ mm., H. 12 mm. *P. albolabris* (Say). Not common: range seems to to be limited to the lower end of Quaker Run Valley. G.D. 28½ mm., H. 18 mm. *P. zaleta* (Binney). Common; on mountain slopes along the entire course of Quaker Run. It occurs in the same localities as *albolabris* but is more widely distributed. G.D. 29 mm., H. 21 mm. *P. dentifera* (Binney). Common on all mountain slopes bordering Quaker Run. G.D. 23¼ mm., H. 14 mm. *P. denotata* (Férussac). Mountain slopes bordering Quaker Run; moisture loving; not common. G.D. 19½ mm., H. 10 mm. *P. thyroidus* (Say). Not common; all specimens so far have been collected on slopes or lowlands bordering the lower end of Quaker Run; none have been found above an altitude of 1600 feet. G.D. 27 mm., H. 17 mm. *P. fraterna* (Say). Not common; on steep slopes above Coon Run and Holt's Run; most abundant in the latter locality. G.D. 10 mm., H. 6 mm.

HAPLOTREMATIDAE. *Haplotrema concavum* (Say). Common

[2] *Polygyra sayana, Polygyra inflecta, Zonitoides demissus, Paravitrea multidentata, Vitrina limpida, Euconulus chersinus, Deroceras agreste, Helicodiscus paralellus, Punctum minutissimum, Pallifera dorsalis, Gastrocopta pentodon, Carychium exile.*

[3] *Succinea avara, Retinella electrina,* and *Deroceras laeve,* besides the subspecies *Succinea avara major.*

under leaves and logs; rarely comes into the open. G.D. 16½ mm., H. 7½ mm.

Zonitidae. *Zonitoides intertextus* (Binney). Common in fairly deep woods; frequently found in the open on old stumps and logs. G.D. 15 mm., H. 10 mm. *Z. ligerus* (Say). Fairly common; under leaves and rotting logs; never in the open. Many young specimens were found associated with *Z. arboreus.* G.D. 15 mm., H. 10 mm. *Z. nitidus* (Müller). In brush heaps and on the ground along the muddy banks of the Allegheny River near Quaker Bridge, New York, and Bradford Junction, New York. G.D. 6 mm., H. 3 mm. *Z. arboreus* (Say). Generally distributed; among brush heaps and in rotting logs. G.D. 5 mm., H. 2½ mm. *Striatura exigua* (Stimpson). One empty shell taken from a mossy hummock on the outer margin of Chamberlain's Bog, a glaciated region. G.D. 2¼ mm., H. 1 mm. *S. milium* (Morse). Not common. Under drifts of leaves on the north side of large rocks, Allegany Rock City. G.D. 1½ mm., H. ½ mm. *S. ferrea* (Morse). Rare; in decaying logs. G.D. 2½ mm., H. 1½ mm. *Paravitrea multidentata* (Binney). Under old leaves around rotting logs; associated with *Z. arboreus.* G.D. 3 mm., H. 1½ mm. *Mesomphix inornatus* (Say). The most common of the larger mollusks in the park; usually hidden under leaves and logs. G.D. 14 mm., H. 6 mm. *Mesomphix cupreus* (Rafinesque). In the same places as *M. inornatus;* not so common. G.D. 25 mm., H. 12 mm. *Retinella indentata* (Say). Rare; our specimens were not fully grown. *Vitrina limpida* Gould. Taken but once; several individuals found under a board on the wet bank of the Allegheny River at Quaker Bridge, New York. G.D. 4 mm., H. 2¾ mm. *Euconulus chersinus* (Say.) In old logs and under leaves on hillsides; not common. G.D. 2½ mm., H. 2¼ mm.

Limacidae. *Deroceras agreste* (Linnaeus). Under stones and wood on river banks at Quaker Bridge and Bradford Junction. L. 1¼ in.

Endodontidae. *Anguispira alternata* (Say). Abundant; under leaves and old logs in woods. G.D. 19 mm., H. 10 mm. *Discus patulus* (Deshayes). Very abundant in decaying logs; associated with *Z. arboreus.* G.D. 9 mm., H. 3 mm. *D. cronkhitei anthonyi* (Pilsbry). Common in drifts of leaves, Allegany Rock City. G.D. 5½ mm., H. 2½ mm. *Helicodiscus parallelus* (Say). Fairly common in old logs in woods. G.D. 3 mm., H. 1 mm. *Punctum minutissimum* (Lea). Common; on dead leaves in open spaces in woods. G.D. 1 mm., H. ½ mm.

Philomycidae. *Philomycus carolinianus* (Bosc). Common on damp wood. Frequently in the open. L. 3 in. *Pallifera*

dorsalis (Binney). On old logs and wet boards on the bank of the Allegheny River at Bradford Junction. L. 1 in.

SUCCINEIDAE. *Succinea retusa* (Lea). Very abundant in low wet places, especially on plants along the Allegheny River. L. 15 mm., W. 8 mm. *S. ovalis* (Say). Fairly common in high, wet woods. L. 12¼ mm., W. 7½ mm. (Blacksnake Mountain). L. 11 mm., W. 6 mm. (Lookout Trail).

COCHLICOPIDAE. *Cochlicopa lubrica* (Müller). Rare; under leaves in high woods; six individuals found under a wet board on the river bank near Quaker Bridge. L. 7 mm., W. 2½ mm. *C. lubrica*, var. *morseana* (Doherty). Blacksnake Mountain. Not abundant. L. 7½ mm., W. 2½ mm.

PUPILLIDAE. *Gastrocopta pentodon* (Say). Rare; so far only empty shells have been found among drifts of dead leaves lying in open spaces on the wooded slopes of Quaker Run Valley. L. 1¾ mm., W. 1 mm. *V. bollesiana* Morse. One specimen. Dead leaves near deep moss, Allegany Rock City. G.D. ¾ mm., H. 1½ mm. *Columella edentula* (Draparnaud). Common on the backs of Christmas Fern and Twisted Stalk; generally distributed. L. 1¾ mm., W. 1 mm.

AURICULIDAE. *Carychium exile* H. C. Lea. Rare; only one record of a few specimens taken in one place near the upper part of Quaker Run. None available for measurement.

LYMNAEIDAE. *Pseudosuccinea columella* (Say). Back waters of Quaker Run at Red Salamander Hill. L. 8 mm., W. 4 mm. Quaker Lake (at School). Aug., 1930. L. 10 mm. *Fossaria modicella* (Say). Stilson's pond near Randolph, New York. L. 8 mm., W. 4½ mm.

PLANORBIDAE. *Helisoma anceps* (Mke). Records of young specimens only. G.D. 7 mm., H. 4.3 mm. *H. trivolvis* (Say). Abundant in lake at School. G.D. 19 mm., H. 9 mm. *Menetus exacuous* (Say). Common; muddy pools at Red Salamander Hill. G.D. 4 mm., H. 1 mm. *M. dilatatus buchanensis* (Lea). In the mud of a pool by Quaker Run opposite the mouth of Dry Brook. G.D. 4 mm., L.D. 3.3 mm., H. 1.5 mm. *Planorbula armigera* (Say). Sides' Pond, Randolph, New York. G.D. 6¾ mm., L.D. 5½ mm., H. 2½ mm.

ANCYLIDAE. *Ferrissia tarda* (Say). Common; Quaker Run, near the School. G.D. 4½ mm., L.D. 3 mm., H. 1¾ mm.

PHYSIDAE. *Physa sayii* (Tappan). Bayou, just off the Allegheny River, near Cold Spring. L. 24 mm., W. 13 mm. *P. sayii oneida* Baker. Two specimens. L. 8 mm. W. 4 mm. *P. heterostropha* (Say). Lake at School. Pools at the foot of Red Salamander Hill. L. 15 mm., W. 9 mm. *P. gyrina* (Say). Lake at School. L. 17 mm., W. 10 mm. *P. integra* Hald.

Allegheny River at Riverside Junction, New York. L. 9 mm., W. 6 mm. *Aplexa hypnorum glabra* DeKay. Pools near Quaker Run at the base of Elko Mountain. L. 15½ mm., W. 8 mm.

VIVIPARIDAE. *Viviparus contectoides* W. G. Binney. From the Allegheny River, just over the state line in Pennsylvania. L. 36 mm., W. 25 mm.

AMNICOLIDAE. *Somatogyrus integer* (Say). Only immature examples found but these were abundant. On stones in the Allegheny River at Bradford Junction.

JAMAICAN LAND SNAILS, 2

BY H. BURRINGTON BAKER

(Plate 2)

The first paper of this series appeared in the July number, pages 6 to 14, in which the symbols used are explained.

Choanopoma triplopoma new species. Figures 6, 12, 13.

Shell (fig. 12) nearest that of *C. fimbriatulum,* but white, usually more depressed and more scabrous; spiral ridgelets (13 visible on penult, 28 on last whorl) narrower and sharper as are also corrugations of relatively broader reflection of peristome; growth riblets fine, but expanded over spiral ridges into delicate, deciduous projections. Alt. (of type male) 12.6 mm., maj. diam. 121 (15.3 mm.), min. diam. 86 (10.8 mm), with 3 whorls remaining. Operculum (fig. 6) almost flat, with about 9 close narrow whorls (like in *fimbriatulum*) ; calcareous plate consisting of a basal lamella, a high, steeply inclined, inner marginal lamella and a subequal, upper ("reflected") lamella, which is inclined upwards to almost horizontal on penult whorls but is inclined downwards and even fused with basal one near rim of last whorl, and which is decorated on upper surface with very strong, oblique, growth riblets that are higher where they join inner lamella; greatest diam. 5.4 mm.

Type locality (ANSP. 139607) : NM2. The calcareous opercular plate in this species shows how that of *C. anomalum* may have arisen by the junction of the rows of cells that secrete the basal and upper lamellae.

C. (Tudorops) redfieldianum magnitesta new subspecies. Figures 8, 9, 14, 15.

Males (fig. 14) about as large as females of *redfieldianum;* shell with lower, more rounded, growth threads, which are less